Claim

1. An organic thin film transistor (OTFT), comprising:

a substrate (1),

a gate electrode (2) formed on the substrate (1),

a gate insulation layer formed on the gate electrode,

a source electrode (5) and a drain electrode (6) formed on the gate insulation layer including a first insulation layer (3) and a second insulation layer (4) with different dielectric constants, and

an active layer (7) which overlays the source electrode (5) and the drain electrode (6).

2. The organic thin film transistor according to claim 1, wherein the dielectric constant of the first insulation layer (3) is higher than that of the second insulation layer (4).

3. The organic thin film transistor according to claim 2, wherein the dielectric constant of the first insulation layer (3) is at least three times higher than that of the second insulation layer (4).

4. The organic thin film transistor according to claim 1, wherein the said first insulation layer (3) is made of organic, inorganic or ferroelectric material.

5. The organic thin film transistor according to claim 4, wherein the said organic material is polyvinylidene fluoride.

6. The organic thin film transistor according to claim 4, wherein the said inorganic material is a metal oxide selected from a group consisting of Ta_2O_5, Al_2O_3 and TiO_2.

7. The organic thin film transistor according to claim 4, wherein the said ferroelectric material is barium titanate.

8. The organic thin film transistor according to claim 4, wherein the said second insulation layer (4) is made of organic polymer material or inorganic material.

9. The organic thin film transistor according to claim 8, wherein the said organic polymer material is poly(methyl methacrylate), polyimide or epoxide resin.

10. The organic thin film transistor according to claim 8, wherein the said inorganic material is SiO_2 or SiN_x.

11. The organic thin film transistor according to claim 1, wherein the said organic semiconductor layer (7) is made of N-type or P-type semiconductor material.

12. The organic thin film transistor according to claim 11, wherein the said N-type semiconductor material is selected from a group consisting of $F_{16}CuPc$, $F_{16}CrPc$, $F_{16}ZnPc$, $F_{16}H_2Pc$, the mixtures thereof, and the eutectics thereof.

13. The organic thin film transistor according to claim 11, wherein the said P-type semiconductor material is selected from a group consisting of CuPc, NiPc, ZnPc, H_2Pc, the mixtures thereof, and the eutectics thereof.

14. The organic thin film transistor according to claim 1, wherein the said organic semiconductor layer (7) is made of a polymer material.

15. The organic thin film transistor according to claim 14, wherein the said polymer material is polythiophene.

16. A process for manufacturing an organic thin film transistor, comprising:

Step 1: sputtering or vaporizing a layer of metal on the substrate and forming it into a gate electrode with the method of photolithography;

Step 2: sputtering or vaporizing a gate insulation film or spin coating a layer of polymer, or sputtering or vaporizing an inorganic film with low dielectric constants as the dual-gate insulation film;

Step 3: forming a layer of metal with the method of vacuous heat evaporation, then forming it into a source electrode and a drain electrode respectively with the method of photolithography;

Step 4: removing the second insulation film in the channel with the method of reactive ion etching in dry process using the source and drain electrodes as the mask; and

Step 5: forming an active layer by vacuous heat evaporating an organic semiconductor material, and then shaping it with the method of photolithography and RIE.

17. The process according to claim 16, wherein the said metal in Step 1 is

selected from a group consisting of Ta, Ti, W and MO.

18. The process according to claim 16, wherein the said gate insulation film is selected from a group consisting of Ta_2O_5, Al_2O_3, TiO_2, BZT.

19. The process according to claim 16, wherein the said polymer material is selected from a group consisting of poly(methyl methacrylate), polyimide, polyvinyl alcohol and polyvinylidene fluoride.

20. The process according to claim 16, wherein the said inorganic film is selected from a group consisting of SiO_2 and SiN_x.

21. The process according to claim 16, wherein the said metal in Step 3 is selected from a group consisting of Au, Ag, Mo and Al.